

Hyperprolactinemia and Erectile Dysfunction

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Hyperprolactinemia from a pituitary adenoma is a rare cause of erectile dysfunction. Men with erectile dysfunction who are found to have a low testosterone level should have a measurement of their prolactin level. Treatment consists of lowering the prolactin level by medication or surgery, or both. Bromocriptine, a dopamine agonist, is efficacious in lowering elevated prolactin levels and can simultaneously shrink these pituitary tumors. With large tumors, transphenoidal surgery may be used to debulk/remove the tumor. Post-treatment prolactin levels can be used to monitor the efficacy of treatment. [Rev Urol. 2000;2(1):39-42]

Key words: Erectile dysfunction • Hyperprolactinemia • Impotence • Pituitary neoplasms
• Prolactin • Magnetic resonance imaging (MRI)

A 40-year-old obese man presented with a complaint of erectile dysfunction throughout the previous 6 years. He was unable to attain and maintain a rigid erection, yet his libido was normal. Mammography, performed recently for a breast lump, was negative for malignancy. The patient had a history of sleep apnea but did not have any neurologic or visual complaints. He was not on any medications. There was also a question of whether he fathered a child in the past.

On physical examination, the patient was markedly obese (1,575.5 kg, or 347 lb) with normal vital signs. Pertinent physical findings included bilateral gynecomastia and a large abdominal pannus. The penis did not have any palpable plaques. Total serum testosterone level was 123 ng/dL (normal, 280 to 1,250 ng/dL), the free testosterone level was 3.1 pg/mL (normal, 12 to 40 pg/mL), and the prolactin level was 396 ng/mL (normal, less than 13 ng/mL). An MRI of the pituitary gland revealed a pituitary macroadenoma with minimal involvement of the right cavernous sinus (Figure 1A - D). The optic chiasm was not involved. Because of the large size of the tumor, a transsphenoidal hypophysectomy of the pituitary adenoma was elected. Following surgery, the patient's prolactin levels dropped to about 90 ng/mL, which indicated subtotal resection of the adenoma. Postoperative medical therapy with a dopamine agonist would be required to lower the prolactin level to normal range.

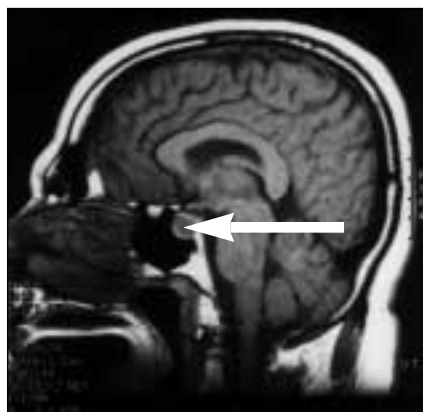


Figure 1A. Midline sagittal section of precontrast MRI of head revealing pituitary macroadenoma (arrow).



Figure 1B. Midline sagittal section of postcontrast MRI of head showing no enhancement of the pituitary adenoma (arrow).

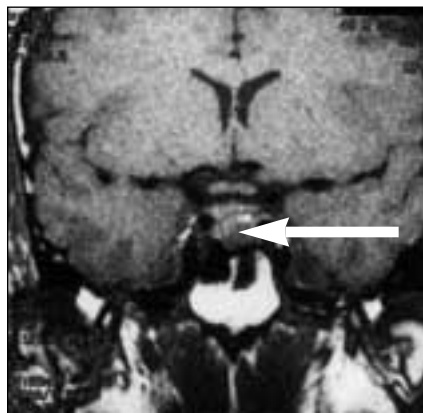


Figure 1C. Midline coronal section of precontrast MRI of head showing pituitary adenoma (arrow).

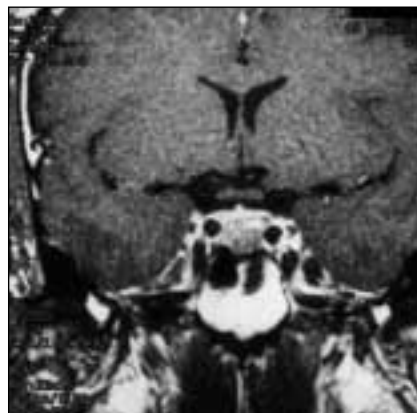


Figure 1D. Midline coronal section of postcontrast MRI of head demonstrating no enhancement of pituitary adenoma.

Discussion

In the evaluation of patients with erectile dysfunction, an endocrinopathy is the rarest of causes.^{1,2} However, when an endocrinopathy does affect erectile function, it is almost always caused by hypogonadism.¹⁻³ Obtaining a serum testosterone (T) level is the most cost-effective way of screening for an endocrinopathy as the cause of erectile dysfunction.^{2,3} If the serum T level is abnormally low, then additional evaluation should include obtaining serum luteinizing hormone, free T, and prolactin levels.² If the serum T is elevated, then a thyroid evaluation may be indicated.²

In our patient, hypogonadism as

well as an elevated prolactin level (prolactin was emanating from the lesion within the pituitary gland) were found. Hyperprolactinemia induces hypogonadism by interfering with the secretion of gonadotropin-releasing hormone (GnRH) from the hypothalamus (Figure 2).^{4,5} The resulting decrease in serum T is believed to be the cause of the erectile dysfunction, although there may be an end-organ effect of prolactin on the penis.⁴ Surprisingly, not everyone with hyperprolactinemia has a low serum T level or complains of erectile dysfunction.^{6,7} However, when the serum prolactin is corrected in patients with an elevated prolactin

level and a low serum T level, the serum T level usually returns to a normal value, and erectile function is usually restored (if erectile dysfunction was present).² Simply treating the patient with exogenous T does not usually correct the erectile dysfunction (unless the prolactin levels are returned to normal).

Hyperprolactinemia is a very rare cause of impotence in a general population of men with impotence.⁸ However, men who have hyperprolactinemia have a high incidence of sexual dysfunction, and the erectile dysfunction appears more likely to resolve in patients with the most severe hyperprolactinemia once this glandular disorder is corrected.⁷

Many medications may also elevate prolactin levels, and this may interfere with erectile function (Table 1). Some of these medications belong to the dopamine antagonist group; this is not surprising, since the normal regulation of prolactin in man is primarily inhibitory (dopamine from the hypothalamus inhibits the secretion of prolactin from the pituitary gland by the inhibiting hormone prolactin inhibitory factor [PIF]). This forms the basis of medical treatment for hyperprolactinemia: dopamine agonists, such as bromocriptine, exert their antiprolactinemic effects by inhibiting the secretion of prolactin by the pituitary cells, which normally secrete prolactin. In hyperprolactinemia induced by exogenous medications, once the suspect medication is stopped, the prolactin and serum T levels and the erectile function (if the impotence is caused by elevated prolactin levels) usually return to normal.^{9,10} If erectile dysfunction is not corrected by lowered prolactin levels, then other causes of the dysfunction must be considered.

More than half of patients with hyperprolactinemia (Table 2) have no demonstrable pituitary lesion, and not every pituitary adenoma produces

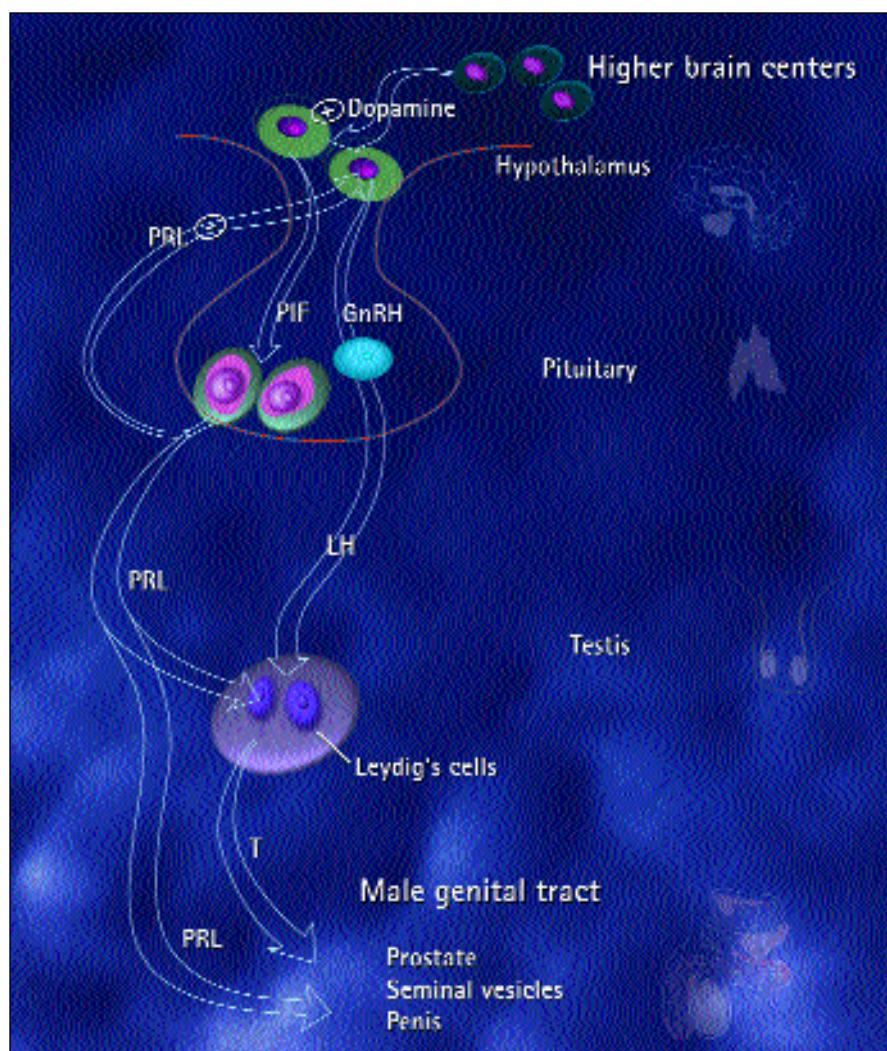


Figure 2. Dopamine from higher brain centers stimulates release of prolactin inhibitory factor (PIF), and prolactin (PRL) from the pituitary inhibits gonadotropin-releasing hormone (GnRH) secretion. Bromocriptine, a dopamine agonist, works to further increase production of PIF to decrease PRL production. LH, Luteinizing hormone.

prolactin. It has been theorized that hyperprolactinemia can also be caused by interfering with PIF that is transported down the pituitary stalk (such as a craniopharyngioma or cystic enlargement within an empty sella that prevents the PIF from reaching its target in the pituitary gland). Whether this PIF is dopamine or some other chemical remains to be determined. Like other causes of erectile dysfunction from hyperprolactinemia, these nonpituitary causes may also lead to erectile dysfunction.

One of the predominant symptoms in men who are hyperprolactinemic is loss of libido.¹¹ Johnson and Jarow¹ reported on a series of 330 consecutive patients who presented for evaluation of impotence; they found an endocrine etiology in 7 (2.1%). All 7 patients had either decreased libido or testicular atrophy; therefore, these investigators recommended that screening for endocrine disorders (as opposed to obtaining a serum T level) should only be done in those patients with clinical signs of hypogonadism.

Table 1
Medications Causing Hyperprolactinemia

Amitriptyline
Amphetamines
Cimetidine
Dopamine antagonists
Estrogens
Methyldopa, levodopa
Opiates: morphine
Phenothiazines, metoclopramide
Prochlorperazine, chlorpromazine

Table 2
Causes of Hyperprolactinemia

Chest wall lesions (herpes zoster)
Chronic renal failure
Cirrhosis
Hypothalamic lesions (stalk section; craniopharyngiomas)
Medications
Pituitary adenomas

Table 3
Signs and Symptoms of Hyperprolactinemia

Decreased libido
Erectile dysfunction
Galactorrhea
Gynecomastia
Headache
Visual-field defects

Routine prolactin measurements are not necessary in the evaluation of patients with erectile dysfunction.^{12,13}

Other presenting symptoms of a pituitary adenoma, with or without hyperprolactinemia, are headaches and visual-field defects (Table 3). When hyperprolactinemia is managed with dopamine agonists, such as bromocriptine, not only will the prolactin levels be decreased, but also

Main Points

- The prolactin level should be measured in men presenting with a complaint of erectile dysfunction who have a low serum testosterone level.
- Hypogonadism is almost always the cause of an endocrinopathy that affects erectile function.
- In hyperprolactinemia, which induces hypogonadism, the excess prolactin interferes with secretion of gonadotropin-releasing hormone, resulting in decreased testosterone and erectile dysfunction.
- Hyperprolactinemia caused by a pituitary tumor can be managed with surgery and/or a dopamine agonist.

shrinkage of the tumors may be seen in about two thirds of patients with pituitary tumors. If present, headaches and visual-field defects may also improve with treatment, regardless of whether the treatment is medical or surgical.^{14,15} Recently, another synthetic dopamine agonist, cabergoline, has been found to be a potent inhibitor of prolactin secretion. Cabergoline is taken twice weekly and is an alternative for patients who are sensitive to bromocriptine.¹⁶

Conclusion

While pituitary tumors—specifically, prolactin-secreting adenomas—are seen rarely in patients presenting solely with impotence, when such tumors do occur, they can be successfully managed with surgery and/or medication. Most patients who present with erectile dysfunction caused

by a prolactin-secreting adenoma will harbor a low serum T level. Therefore, the serum T appears to be an excellent screening test for these patients. Once the prolactin level is determined to be elevated, the pituitary/hypothalamic area is imaged either by MRI or by CT scan. Treatment of patients with hyperprolactinemia—whether by surgery, medication, or both—depends on the findings seen on radiologic scans, with most patients receiving a dopamine agonist initially. For those who undergo surgery and still have a postoperative elevated prolactin level, which suggests residual adenoma, medical therapy is instituted.¹⁷ ■

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